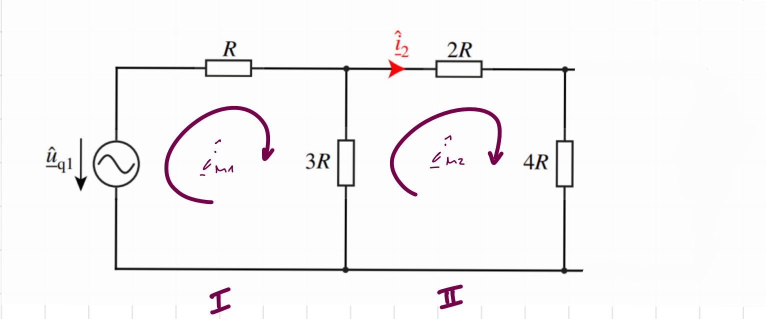
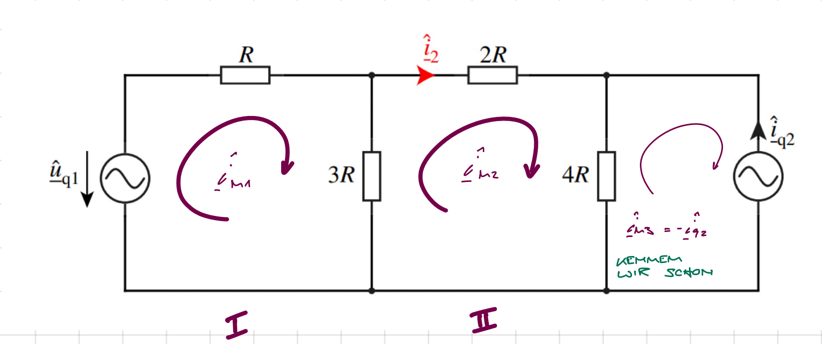
MLSZ_W07: Bsp1



STROMQUELLEN ABSCHALTEN!

→ MASCHENSTRÖME DEFINIEREN

STROMQUELLEN WIEDER EINSCHALTEN...



MASCHENGLEICHUNGEN AUFSTELLEN ...

$$\text{I}: \quad R\cdot\hat{i}_{m1} + 3R\left(\hat{i}_{m1} - \hat{i}_{m2}\right) - \hat{u}_{q1} = 0$$

$$-\hat{i}_{m3} = +\hat{i}_{q2}$$

$$\text{II}: \quad 3R\left(\hat{i}_{m2} - \hat{i}_{m1}\right) + 2R\,\hat{i}_{m2} + 4R\left(\hat{i}_{m2} - \hat{i}_{m3}\right) = 0$$

IM MATRIXFORM BRINGEN ...

$$\text{I}: \quad \hat{i}_{m1}\cdot 4R + \hat{i}_{m2}(-3R) = \hat{u}_{q1}$$

$$\text{II}: \quad \hat{i}_{m1}(-3R) + \hat{i}_{m2}(9R) = -\hat{i}_{q2}\cdot 4R$$

$$\underbrace{\begin{bmatrix} 4R & -3R \\ -3R & 4R \end{bmatrix}}_{Z_m} \begin{bmatrix} \hat{i}_{m1} \\ \hat{i}_{m2} \end{bmatrix} = \begin{bmatrix} \hat{u}_{q1} \\ -\hat{i}_{q2}\cdot 4R \end{bmatrix}$$

$$\det(Z_m) = 36R^2 - 9R^2 = \underline{\underline{27R^2}}$$

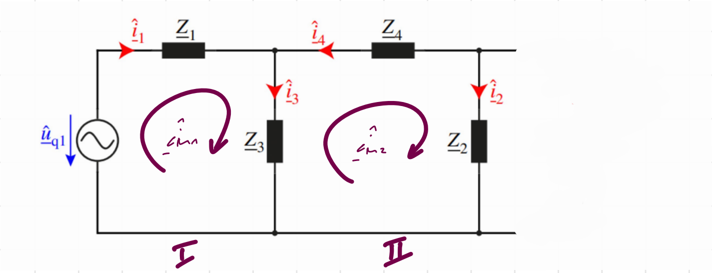
$$\begin{bmatrix} \hat{i}_{m1} \\ \hat{i}_{m2} \end{bmatrix} = \frac{1}{27R^{\cancel{2}}} \begin{bmatrix} 9\cancel{R} & 3\cancel{R} \\ 3\cancel{R} & 4\cancel{R} \end{bmatrix} \begin{bmatrix} \hat{u}_{q1} \\ (-4)\,\hat{i}_{q2} \end{bmatrix}$$

$$\hat{i}_{m2} = \frac{1}{27R^2}\left[3R\cdot\hat{u}_{q1} - 16R^2\,\hat{i}_{q2}\right] = \underline{\underline{\frac{\hat{u}_{q1}}{9R} - \frac{16\,\hat{i}_{q2}}{27}}}$$

$\frac{U}{R} = I$

→ MACHT ALSO SINN MIT "EINHEITEN"

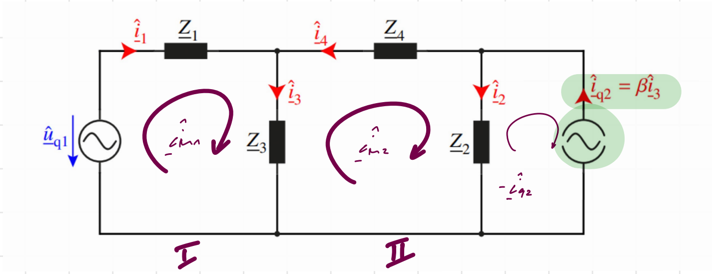
MLSZ_W07 : BSP 2



STROMQUELLEN ABSCHALTEN!

→ MASCHENSTRÖME DEFINIEREN

STROMQUELLEN WIEDER EINSCHALTEN...



MASCHENGLEICHUNGEN AUFSTELLEN ...

$$\mathrm{I}: \quad \underline{Z}_1 \hat{\underline{i}}_{m1} + \underline{Z}_3 (\hat{\underline{i}}_{m1} - \hat{\underline{i}}_{m2}) - \hat{\underline{u}}_{q1} = 0$$

$$\mathrm{II}: \quad \underline{Z}_3 (\hat{\underline{i}}_{m2} - \hat{\underline{i}}_{m1}) + \underline{Z}_4 \hat{\underline{i}}_{m2} + \underline{Z}_2 (\hat{\underline{i}}_{m2} + \hat{\underline{i}}_{m1}) = 0$$

→ BEI DIESER GESTEUERTEN QUELLE GILT:

$$\hat{\underline{i}}_3 = \hat{\underline{i}}_{m1} - \hat{\underline{i}}_{m2}$$

$$\Longleftrightarrow \quad \hat{\underline{i}}_{q2} = \beta (\hat{\underline{i}}_{m1} - \hat{\underline{i}}_{m2})$$

IN MATRIXFORM BRINGEN ...

$$\mathrm{I}: \quad \hat{\underline{i}}_{m1} (\underline{Z}_1 + \underline{Z}_3) + \hat{\underline{i}}_{m2} (-\underline{Z}_3) = \hat{\underline{u}}_{q1}$$

$$\mathrm{II}: \quad \underline{Z}_3 (\hat{\underline{i}}_{m2} - \hat{\underline{i}}_{m1}) + \underline{Z}_4 \hat{\underline{i}}_{m2} + \underline{Z}_2 (\hat{\underline{i}}_{m2} + \beta \hat{\underline{i}}_{m1} - \beta \hat{\underline{i}}_{m2}) = 0$$

$\Longleftrightarrow$

$$\mathrm{I}: \quad \hat{\underline{i}}_{m1} (\underline{Z}_1 + \underline{Z}_3) + \hat{\underline{i}}_{m2} (-\underline{Z}_3) = \hat{\underline{u}}_{q1}$$

$$\mathrm{II}: \quad \hat{\underline{i}}_{m1} (\beta \underline{Z}_2 - \underline{Z}_3) + \hat{\underline{i}}_{m2} (\underline{Z}_3 + \underline{Z}_4 + \underline{Z}_2 - \beta \underline{Z}_2) = 0$$

$$\Longleftrightarrow \quad \underline{\begin{bmatrix} \underline{Z}_1 + \underline{Z}_3 & -\underline{Z}_3 \\ \beta \underline{Z}_2 - \underline{Z}_3 & \underline{Z}_3 + \underline{Z}_4 + \underline{Z}_2 - \beta \underline{Z}_2 \end{bmatrix} \begin{bmatrix} \hat{\underline{i}}_{m1} \\ \hat{\underline{i}}_{m2} \end{bmatrix} = \begin{bmatrix} \hat{\underline{u}}_{q1} \\ 0 \end{bmatrix}}$$

(NICHT MEHR SYMMETRISCH, DA GESTEUERTE QUELLEN)